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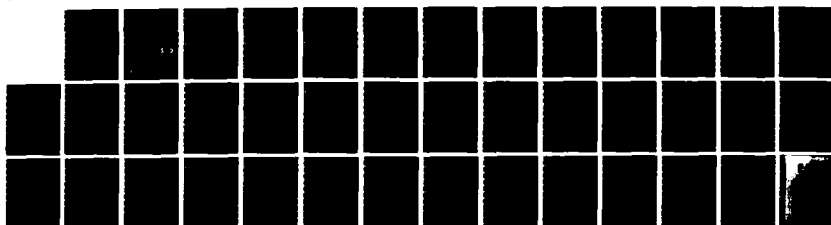
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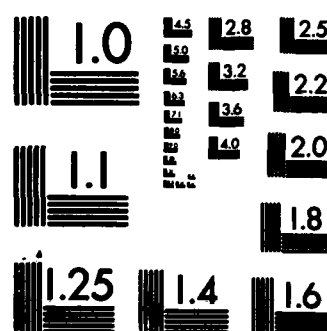
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PATIENT SCENARIOS ILLUSTRATING BENEFITS OF AUTOMATION
IN DoD MEDICAL TREATMENT FACILITIES

Prepared for

TRIMIS Program Office
6917 Arlington Road
Bethesda, Maryland 20014

Submitted by

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October 23, 1981

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report outlines the difference that automation may make in patient encounters within the military health care system. Two scenarios are given: one which describes the sequence and timing of events in an MTF with a totally manual information process and the second describing the process as it might occur in a fully automated MTF. ↑		

INTRODUCTION

Patient scenarios have been developed illustrating the difference that automation may make in patient encounters with the military health care system, as part of a task to characterize the benefit set of automation in DoD Medical Treatment Facilities (MTFs). For two hypothetical typical patients -- an outpatient and an inpatient -- two scenarios are given; the first describing the sequence and timing of events in an MTF with a totally manual information process and the second describing the process as it might occur in a fully automated MTF. Time lines are presented in Figures 1 and 2 to depict graphically the differences in elapsed times of the series of events comprising the outpatient or inpatient encounter.



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OUTPATIENT SCENARIO--MANUAL INFORMATION PROCESSING

Captain Robert Jones, 44, is leaving his physician's clinic office at 10:15 on Thursday, July 20. Three months ago, Captain Jones had a mild heart attack and he is currently taking medications consisting of a diuretic and potassium chloride (KCl). The level of potassium in his blood--a quantity affected by diuretic dosage--his blood pressure, and his cardiac function are being closely monitored by his physician during regular appointments at the Internal Medicine Clinic (IMC) of a 150-bed Medical Treatment Facility (MTF). The MTF is located 30 minutes away from his home and 15 minutes from his duty station. Captain Jones' physician has just given him some partially completed requisition orders for a serum potassium level determination and a chest x-ray and a renewal prescription for a six-week supply of Lasix (20 mg) and KCl elixer (15 meq/day). The physician has told Captain Jones that if the test or the exam reports show surprising results, he will contact him. In the meantime, he has suggested that the Captain make an appointment for a follow-up visit in six weeks' time, when the physician will further evaluate his cardiac function and diuretic and KCl elixer dosages.

Captain Jones takes the partially completed forms to the clerk at the Internal Medicine Clinic reception desk, placing them on the counter in front of her. Busy on the telephone with the Radiology Department scheduling clerk, she starts work on the forms after 5 minutes. She writes some information on them and hands them to the Captain after 2 minutes, telling him to fill in the rest of the blanks. She then directs him to the various ancillary departments.

Captain Jones first goes to the Radiology Department. He completes the requisition form in 2 minutes and hands it to the clerk at the reception window. The clerk reads the form and then checks the department schedule. Not finding his name among those with appointments, she tells him to wait a few minutes. After 20 minutes, she calls him to the receiving

window, finds his requisition form, and transcribes his name and Social Security number onto the department log. A technician then takes him to the x-ray room and performs PA and Lateral chest films. The technician logs their performance into an examination log book and sets the films aside to be interpreted by a radiologist that afternoon.

After leaving the Radiology Department, Captain Jones takes the serum potassium level requisition to the Clinical Laboratory and gives it to the clerk at the receiving desk there. He is told to wait a few minutes until a phlebotomist is available to draw his blood. After 15 minutes the clerk calls him to the desk, asks him for his full name and Social Security number, and transcribes these into the Clinical Laboratory log book and onto specimen labels, which she affixes to blood tubes. Captain Jones is taken to the blood drawing cubicle in the laboratory; his blood is drawn by a phlebotomist. The phlebotomist places the labeled specimen tubes in a rack to await analysis. Captain Jones is told that he may leave the laboratory and he does so.

Captain Jones walks to the Outpatient Pharmacy. He goes to the receiving window, waits in line for 5 minutes and then gives his prescription order forms to the pharmacy technician. He also gives him the empty container of a Darvon prescription for Mrs. Jones; the container's label reads "May be refilled 1 time." The pharmacy technician takes 1 minute to decipher the scrawled prescription order, noting the presence of the specific dosage, quantity of medication, and the signature of the physician. He asks Captain Jones for his full name and Social Security number, and writes these clearly on the Lasix and KCl elixer order forms. Captain Jones is told that he will be called when his prescriptions are ready. He leaves the window and seats himself in the waiting area.

The pharmacy technician types labels for the Lasix and the KCl elixer and affixes them to empty containers. He places the Darvon container and the empty containers onto a tray of containers waiting to be filled. Another pharmacy technician then fills the containers; a pharmacist

checks them; and they are set by the distribution window. Two minutes after they are set there, when the pharmacy technician at the distribution window is free, he calls Captain Jones to the window. Captain Jones waits there for 2 minutes as the medications are logged. The medications are then handed to him.

At 12:00, Captain Jones goes to a telephone nearby the Pharmacy to arrange for another clinic appointment. He dials the Central Appointment Section (CAS) number and, getting no answer after ten rings, hangs up and dials again. This time the telephone is answered by a recorded message, which tells him to hold the line. Captain Jones waits for 1.5 minutes, at which time a clerk answers. Captain Jones requests that he be scheduled for an appointment at the Internal Medicine Clinic in six weeks' time. The clerk tells him to hold on and scans the Internal Medicine Appointment Sheet on the rotary. After 1 minute she returns to the telephone and informs Captain Jones that the Internal Medicine Clinic Appointment Sheet for September has not yet been delivered to the Central Appointment Section, so that no appointments for that month can be made at this time.

Captain Jones leaves the MTF at 12:10 and goes to his duty station, arriving there at 12:25.

Captain Jones' physician receives the radiologist's x-ray interpretation report on July 26, but he does not receive a report of the laboratory results.

Captain Jones is on TDY for the next few weeks and forgets to call again for an appointment until the third week of August. He then telephones CAS, waits 1 minute for a clerk to come on the line, and requests an appointment for the first week in September. The clerk tells him that she will check the schedule. She returns to the phone after 1 minute, and tells him that all appointments for that week are filled. She asks him for his name, Social Security number and telephone number and transcribes these onto an alternates sheet. She tells him that an appointment

clerk will telephone him if any appointments become available due to patient cancellations.

On September 4, Captain Jones receives a telephone call from CAS, telling him that there has been a cancellation. A 10:00 appointment on September 6 is now open. Captain Jones agrees to be scheduled for the appointment.

Captain Jones arrives at the Internal Medicine Clinic desk at 9:55 on September 6, waits in line there for 5 minutes, and then presents his military identification card to the receptionist. He tells her his name and Social Security number. She checks the appointment schedule, does not see Captain Jones' name, and inquires when the appointment was made and for what time. He explains that his appointment was made just two days ago, after another patient had cancelled. She nods, looking in the file of medical records for his chart. After 2 minutes of searching, she goes back to Captain Jones and explains that his medical record has not been delivered to the clinic--that this is not unusual given how recently the appointment was made--and that he should go to the medical record room to obtain it before being seen by his physician.

Captain Jones goes to the Outpatient Medical Record Department and waits 2 minutes for a record clerk to be free. He then requests his record, telling the clerk his name and Social Security number. The medical record clerk goes to the file room, returning 4 minutes later. He hands Captain Jones a record.

Captain Jones returns to the Internal Medicine Clinic.

Meanwhile, the receptionist at the Internal Medicine Clinic has spoken with Captain Jones' physician, who was inquiring about the location of his 10:00 patient. The physician, hearing that Captain Jones would be arriving soon, has given the receptionist a signed requisition form for an ECG, telling her that a tracing should be taken on the occasion of each clinic visit before Captain Jones is examined. When Captain Jones

arrives at the clinic desk, the receptionist fills in some portions of the requisition form, and hands it to the Captain to complete, directing him to the ECG Department.

Captain Jones goes to the ECG Department waiting area and completes the requisition form. He then presents it to the corpsman at the ECG Department desk. The corpsman transcribes Captain Jones' name and Social Security number and the origin of the requisition into the department log and tells Captain Jones to wait a few minutes.

After 15 minutes, Captain Jones' name is called and he is taken to the ECG room and prepared for the tracing. A technician takes one ECG tracing, and then stops the machine, telling Captain Jones that the ECG machine has run out of paper; Captain Jones must wait a few minutes while the paper is replaced. The technician goes to one of the supply cabinets lining the wall of the ECG room. He finds no ECG paper there. He tells Captain Jones that he will have to wait a few more minutes while he obtains some more paper from Central Supply. The technician leaves Captain Jones and goes to the Central Supply Room in the basement of the MTF. After 15 minutes, he returns with the paper. He replaces the paper in the ECG machine and performs a second tracing on Captain Jones. He then transcribes Captain Jones' name and Social Security number onto the two tracings and gives one of these to the Captain to take back to the Internal Medicine Clinic, putting the other tracing aside to be sent to a central referral site and read by a cardiologist. The cardiologist's report is expected to be returned to the MTF in one week.

Captain Jones goes back to the Internal Medicine Clinic with his ECG tracing and the medical record, which he had obtained earlier. The receptionist asks for the record; he hands it to her. Upon opening the record, she notes that it is not the one belonging to Captain Jones, but rather that of his son, Robert Jones, Jr. She hands the record back to the Captain, telling him that it is the wrong one, and he must go back and obtain the correct record from the record room.

Captain Jones goes back to the Outpatient Medical Record Department, waits for 1 minute for a clerk to be free, and then hands his son's record to him, explaining that the Family Member Prefix Code on it is not his, but his son's. The clerk goes to the file room, returning in 2 minutes with the correct record. He hands it to Captain Jones. He goes back to the Internal Medicine Clinic with his record and the ECG tracing.

Captain Jones arrives at the reception desk of the Internal Medicine Clinic, waits 2 minutes for the receptionist to be free, and hands her his record. She asks him for certain pieces of demographic information to ascertain that the clinic's record is accurate. She then transcribes appropriate data onto an SF 600 and inserts this in his record. She tells him to wait a few minutes until his physician is ready to see him.

Captain Jones waits for 8 minutes before being called into his physician's office. He then goes into the office, handing the doctor his outpatient record and the new ECG tracing. The physician glances at the record and then examines the Captain. He writes several notes on the SF 600. He then checks the ECG tracing and compares it briefly with the last one, taken 6 weeks ago. He notes no apparent change, and records this on the SF 600. The physician looks through the record several times, searching for the result of the serum potassium level test of July 20. He cannot find the report. He asks Captain Jones if he indeed did have the lab test performed in July. Captain Jones replies that he did. The physician telephones the Clinical Laboratory to determine if the result of the test is still in the laboratory records. The clerk there says that he will check; in 3 minutes he returns the call, informing the physician that though a record of blood being drawn appears in the laboratory log book, the order slip with results transcribed cannot be located.

The physician informs Captain Jones that he is unable to fully evaluate his condition without the lab result, which seems to have been lost. The purpose of this clinic visit has been primarily to decide if the

medication dosages that Captain Jones has been receiving are appropriate, and without the laboratory results, this cannot be determined. The doctor says that Captain Jones must have a repeat blood sample drawn and return for a repeat clinic visit--and at that time, of course, have another ECG tracing performed--in order for his medication dosages and his cardiac function to be fully evaluated. He suggests that Captain Jones stop at the Clinical Laboratory on his way out of the MTF today, and make an appointment to return to the Internal Medicine Clinic in a week or two. He says that in the meantime, he will keep Captain Jones at his present level of Lasix and KCl elixer. The physician partially completes prescription orders for two-week supplies of Lasix and KCL elixer and an order for the repeat serum potassium test and gives these to Captain Jones.

Captain Jones takes the partially completed orders to the Internal Medicine Clinic reception desk at 12:15, where he waits for a clerk to fill them in. Captain Jones then completes them, goes to the Pharmacy and the Clinic Laboratory, telephones CAS, and, at 13:20, leaves the MTF to return to his duty station, arriving there at 13:35.

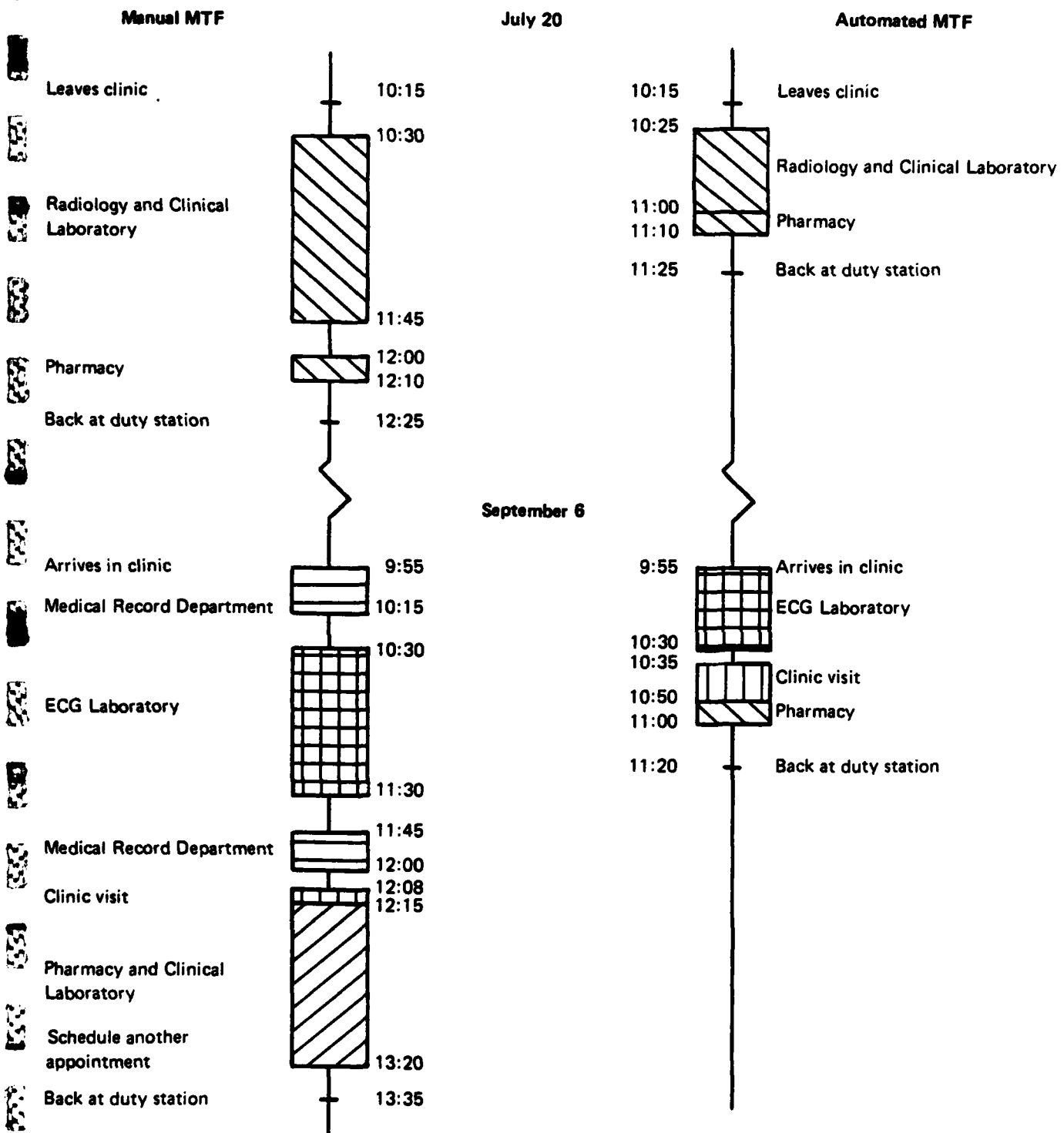


FIGURE 1 TIME LINE FOR OUTPATIENT SCENARIOS

OUTPATIENT SCENARIO--AUTOMATED INFORMATION PROCESSING

Captain Robert Jones, 44, is leaving his physician's clinic office at 10:15 on Thursday, July 20. Three months ago, Captain Jones had a mild heart attack, and he is currently taking medications consisting of a diuretic and potassium chloride (KCl). The level of potassium in his blood--a quantity affected by diuretic dosage--his blood pressure, and his cardiac function are being closely monitored by his physician during regular appointments at the Internal Medicine Clinic (IMC) of a 150-bed fully-automated Medical Treatment Facility (MTF). The MTF is located 30 minutes away from his home and 15 minutes away from his duty station. From a CRT in his clinic office, Captain Jones' physician has transmitted to the appropriate departments requisition orders for a serum potassium level determination and a chest x-ray. The physician has also transmitted to the Pharmacy a prescription order for a six-week supply of Lasix (20 mg) and KCl elixer (15 meq/day). The physician has told Captain Jones that if the test or the exam reports show surprising results, he will contact him. In the meantime, he has suggested that the Captain make an appointment for a follow-up visit in six weeks' time, when the physician will further evaluate his cardiac function and diuretic and KCl elixer dosages.

Captain Jones goes directly to the Radiology Department. He presents himself at the receiving window and tells the clerk his name and Social Security number. The clerk checks the requisition orders that have been received at the Radiology Department printer, registers the Captain's arrival on the CRT, and then tells the Captain to be seated.

After 5 minutes, his name is called and a technician takes him to the x-ray room and performs PA and Lateral chest films. The technician logs their performance into a CRT and sets the films aside to be interpreted by a radiologist that afternoon.

After leaving the Radiology Department, Captain Jones proceeds to the Clinical Laboratory and checks in with the clerk at the receiving desk there, telling her his name and Social Security number. She notes that the test requisition has been received and the specimen tube labels prepared by the automated printer in the laboratory. She affixes the labels to specimen tubes. Captain Jones is told to wait a few minutes until a phlebotomist is available to draw his blood. After 10 minutes, Captain Jones is taken to the blood drawing cubicle in the laboratory; his blood is drawn by a phlebotomist. The phlebotomist affixes the labels to the specimen tubes and places the tubes in a rack to await analysis. Captain Jones is told that he may leave the laboratory, and he does so.

Captain Jones walks to the Outpatient Pharmacy. He goes directly to the distribution window, waits in line for 1 minute, and then identifies himself by name and Social Security number to the pharmacy technician. The technician checks the prescriptions that are waiting for distribution and, finding two with Captain Jones' name and Social Security number on them, tells him that the new prescriptions for Lasix and KCl elixer are ready, as is a refill prescription for Darvon telephoned into the Pharmacy that morning by Mrs. Jones. The medications are handed to him.

At the time that his wife had phoned in, the pharmacist had been able to call up Mrs. Jones' medication profile, verifying that this was a legitimate refill order, and automatically registering that the last refill for this prescription was hereby dispensed.

Upon receiving the medication orders from Captain Jones' physician, the computer had automatically checked the on-line pharmacy formulary to make sure that the appropriate medications and dosages were available. Labels for the three containers had been automatically generated by the printer. A pharmacy clerk had affixed these onto the containers and placed them onto a tray of containers waiting to be filled. A pharmacy technician had filled the containers; a pharmacist had checked them; and they had been set by the distribution window.

At 11:05, Captain Jones goes to a telephone near the Pharmacy to arrange for another clinic appointment. He dials the Central Appointment Section (CAS) number and reaches a clerk after three rings. Captain Jones requests that he be scheduled for an appointment at the Internal Medicine Clinic in six weeks' time. The clerk tells him to hold on and scans the Internal Medicine Appointment Roster. After 0.5 minutes, she returns to the telephone and informs Captain Jones that the Internal Medicine Clinic Appointment Roster for September has not yet been prepared, so that no appointments for that month can be made at this time.

Captain Jones leaves the MTF at 11:10 and goes to his duty station, arriving there at 11:25.

Captain Jones' physician receives the radiologist's x-ray interpretation report and a report of the laboratory results on July 21. The serum potassium level result appears to be low, but not dangerously so. The physician asks a clerk in the Internal Medicine Clinic to telephone Captain Jones and tell him to come to the MTF soon for a new prescription and to check with his physician at that time.

Captain Jones, however, is on TDY for the next few weeks and the clerk is unable to reach him by telephone. The physician assures the clerk that the situation is not critical; Captain Jones can wait for the new prescription until the next scheduled appointment, if necessary.

Captain Jones forgets to call for an appointment until the third week of August, when he returns from TDY. He then telephones CAS, waits 1 minute for a clerk to come on the line, and requests an appointment for the first week in September. The clerk checks the availability of appointments on a CRT and gives him an appointment for 10:00 on September 6. The clerk asks for his Social Security number and then asks him to verify the patient registration information that appears on her CRT.

Captain Jones arrives at the Internal Medicine Clinic desk at 9:55 on September 6, waits in line there for 1 minute, and then presents his military identification card to the receptionist. He tells her his name and Social Security number. She verifies his appointment on the automated Appointment Roster and keys in a code indicating that he has arrived. She looks in the file of printouts that have been made of the automated outpatient records for today's patients and notes that Captain Jones' printout is there. She then advises Captain Jones that his physician has told her that an ECG tracing should be taken on the occasion of each clinic visit before Captain Jones is examined. The clerk tells Captain Jones to proceed to the ECG Department, as his physician has already keyed the ECG requisition into his CRT.

Captain Jones goes to the ECG Department and checks in with the corpsman at the receiving desk there, telling him his name and Social Security number. The corpsman registers Captain Jones' arrival on a CRT, which displays the transmitted order from the physician for an ECG tracing and an order for a serial comparison with the previous tracings taken on Captain Jones. He tells Captain Jones to wait a few minutes.

After 10 minutes, Captain Jones' name is called, and he is taken to the ECG room and prepared for the tracing. A technician takes one ECG tracing, and then stops the machine, telling Captain Jones that the ECG machine has run out of paper; Captain Jones must wait a few minutes while the paper is replaced. The technician goes to one of the supply cabinets lining the wall of the ECG room. He finds the ECG paper there and replaces the paper in the machine. He performs a second tracing on Captain Jones. The Captain's name and Social Security number and pertinent medical information are printed on the two tracings. While Captain Jones is dressing, the printer in the ECG Department prints a computerized, unconfirmed interpretation of the two new tracings and a computerized serial comparison with the previous tracings taken on Captain Jones. The technician gives the Captain the computerized interpretation, the computerized serial comparison, and one of the new tracings

to take back to the Internal Medicine Clinic. The two tracings are automatically transmitted to a central overread site and read by a cardiologist. The confirmed interpretation is transmitted back to the MTF the next day.

Captain Jones goes back to the Internal Medicine Clinic with his ECG tracing and the computer printouts. He goes to the reception desk; the receptionist is free. He checks in and she hands him the printout of his record and tells him to wait a few minutes until his physician is ready to see him.

Captain Jones waits for 5 minutes before being called into his physician's office. He goes into the office, handing the doctor his new ECG tracing, the computerized interpretations, and his hard copy record. The physician glances at the record and then examines the Captain. He keys several notes into his CRT and checks the cumulative diagnostic summary in the automated patient record for the results of the blood test and x-ray taken on July 20. He notes that the x-ray was normal; and, as he recalls noting earlier, the serum potassium level was low. He advises Captain Jones that his dosage of KCl must be increased. The physician checks the new ECG tracing and computerized interpretation, compares the current and prior tracings, and concurs with the computer reading. The physician enters the new prescription order directly from the CRT in his office and tells Captain Jones to return for another visit in 8 weeks.

On his way out of the MTF, at 10:50, Captain Jones stops at the Pharmacy to pick up his prescription. He checks in with the clerk at the receiving window who advises him that his prescription is already being filled but is not quite ready. After 5 minutes, his name is called, and he goes to the window to pick up his prescription. He telephones CAS, and, at 11:05, leaves the MTF to return to his duty station, arriving there at 11:20.

INPATIENT SCENARIO--MANUAL INFORMATION PROCESSING

On Wednesday, September 1, at 13:15, Major John Smith, age 35, is being examined in a surgeon's clinic office in a 350-bed Medical Treatment Facility (MTF), located 20 minutes from his home and 35 minutes from his duty station. He has had a chest x-ray and several laboratory procedures during a recent visit to the Family Practice Clinic and his family physician had referred him to the Surgery Clinic for consultation. The surgeon examines Major Smith and reviews the x-rays, which show a solitary nodule in the left lung--new, according to the written report. He examines the laboratory report, which shows a low white blood cell count. He determines that Major Smith should be admitted to the hospital for a lung biopsy. The surgeon telephones a clerk at the Surgery Clinic desk, requesting that an attempt be made to schedule a lung biopsy for Major Smith for Wednesday, September 8. The surgeon reads the clerk Major Smith's full name, Social Security number, and Family Member Prefix Code, and describes to him the type of surgery to be scheduled.

The clerks at the clinic desk, busy with registering outpatients arriving in the department, are unable to telephone the Operating Room (OR) nurse until 14:15. At that time, a clerk telephones the OR to inquire about the availability of an OR suite for Major Smith on Wednesday, September 8. He explains that Major Smith will undergo an elective lung biopsy. The nurse says that she will check the OR roster and return the call. After 15 minutes, she does so, having determined that Major Smith can be scheduled for elective surgery at 10:00 on September 8. She enters Major Smith's name and Social Security number onto the OR schedule.

The clerk in the Surgery Clinic telephones Major Smith's surgeon at 15:00, informing him of the arrangements that have been made. She then telephones the Radiology Department to make an appointment for Major Smith's pre-operative chest x-ray. She explains to the radiology clerk that Major Smith will be having surgery on September 8, and must have a chest x-ray

on September 7, at some point during the day. The clerk checks the schedule, and determines that x-ray time is available at 11:00. She enters Major Smith's name and Social Security number on the department schedule.

On Tuesday morning September 2, at 9:15, Major Smith telephones the Surgery Clinic from his office to ascertain if his biopsy has been scheduled. The clerk who answers the telephone tells him to wait a moment while she checks. After 3 minutes she returns to the telephone and informs Major Smith that his surgery is scheduled for September 8. She suggests that he plan to arrive at the hospital at 9:30 on September 7, come to the Surgery Clinic to pick up requisition orders for pre-operative work-up procedures and various other documents, and spend that day undergoing the pre-operative and admission procedures.

On the morning of September 7, Major Smith arrives at the Surgery Clinic at 9:30, having left home at 9:10. At the reception desk, the clerk examines Major Smith's military identification card, asks him at what time on September 8 his surgery is scheduled to begin, and then telephones the surgeon. She speaks to the surgeon for 3 minutes. She then informs Major Smith that his admission and surgery must be postponed by 24 hours because more emergency surgical procedures than anticipated have occurred during the past week. The clerk apologizes for giving Major Smith this news at the last minute, but explains that these things are unpredictable and, though data from physicians and nursing staff regarding the amount of elective OR time available are usually collected at the beginning of the evening shift (i.e., had been turned in at 16:00 the day before), it had only become apparent to the OR nurse when she was compiling the official daily OR schedule early Tuesday morning, that some of the elective surgical admissions would have to be removed from Wednesday's schedule. Major Smith leaves the hospital and goes home, arriving there at 10:05.

Major Smith returns to the Surgery Clinic at 9:40 Wednesday morning having left home at 9:20. He presents his military identification card to the

clerk at the reception desk; she examines the card, and, glancing back at it to remind herself of his name and number, looks in a file box for the requisition orders for Major Smith's pre-operative work-up procedures. It takes her 3 minutes to find the slips signed by the surgeon. She asks Major Smith for his full name and Social Security number and quickly transcribes these onto the various slips made out for an ECG, a chest x-ray, several blood tests, and a urinalysis. She fills out all applicable portions of an Admission Authorization and Treatment Statement and takes it to the surgeon to sign.

She returns in 3 minutes with the signed form and hands it, with the order slips, to Major Smith. She notices that his admission has been postponed from the original day scheduled and asks if he knows if a new x-ray appointment has been made. He says that he is unaware of any. She telephones the Radiology Department, gets a busy signal, calls twice more, gets through to a clerk there, and inquires about the possibility of scheduling Major Smith for a chest x-ray during the afternoon. The radiology clerk checks the department schedule and makes an appointment for Major Smith for 14:00. She asks the surgery clerk for Major Smith's full name and Social Security number and enters these onto the department schedule.

The Surgery Department clerk informs Major Smith that he is scheduled for an x-ray that afternoon, writes down the time on a slip of paper, hands this to him, and then directs him to the various ancillary departments and to the admitting office.

Major Smith arrives at the Admissions and Dispositions Office at 10:15. He gives his name to the admitting clerk and waits for 15 minutes until a clerk is free to register him. He hands the clerk his military identification card. Major Smith informs the clerk that though he has never been an inpatient at this MTF, he is registered as an outpatient. He presents his Admission Authorization and Treatment Statement. The clerk writes Major Smith's Social Security number on this form and gives it to

Major Smith to sign, along with a Privacy Act Statement. She asks Major Smith for his full name, assigns him a unique register number and transcribes these onto the Admission Authorization and Patient Location File and the Admissions and Dispositions Worksheet. The clerk transcribes Major Smith's full name and Social Security number onto a clinical record cover sheet and collects and transcribes various other pieces of demographic information. She then sends Major Smith to the Outpatient Medical Record Room to obtain his record, and bring it to the desk.

Major Smith goes to the Record Room and requests his record. The clerk asks for his name and Social Security number and goes to the file room. She returns in 10 minutes, having had some difficulty locating the record. She gives the record to him.

He returns to the Admissions and Dispositions Office and waits 5 minutes until a clerk is free to complete the registration process. She takes his outpatient record, finds Major Smith's various admission papers, and then completes a Notification of Active Duty Patient Admission Form. She telephones the general surgical unit to notify the nurses there of Major Smith's arrival and inquires about his bed assignment. She then enters Major Smith's name and bed assignment onto the Bed Status Work Sheet.

She prepares a Patient Wrist Band for Major Smith, an Emergency Data Form, and two addressograph plates containing demographic and admission data. Using one of these plates, she imprints a Nominal Index File Card, a Clinical Record Cover Sheet, a Patient's Clearance Record, and a Clinical Record Jacket. Several 3x5 cards are imprinted, to be sent to the Information Desk, the Mail Room, the Clinical Records Section, the Chaplain, etc. These cards are placed in separate slots in a large box, to be distributed to the various departments later in the day. The clerk then hands Major Smith his chart and directs him to the Resource Management Office to deposit his valuables and to the general surgical ward.

Major Smith goes to the MSA office and deposits his valuables with the clerk there. She asks him for his name and Social Security number, completes a receipt and hands this to him.

Major Smith leaves the registration area and goes to the ward. Upon arrival, he waits at the nursing station for the ward clerk to check his bed assignment. After 2 minutes, he is taken to his bed. The clerk asks him for his physician's name and then goes back to the nurses station with his chart to complete its assembly. The ward clerk reviews the contents of the chart, and adds some forms to it. He then directs Major Smith to the ancillary departments.

After leaving the ward at 11:30 Major Smith goes to the Clinical Laboratory. He takes his requisition form to the clerk at the desk there. The clerk examines the form and tells him to wait a few minutes until a phlebotomist is free to draw his blood. After 20 minutes, he is called to the desk. The clerk transcribes his name and Social Security number onto three labels, which she attaches to specimen containers. Major Smith's blood is drawn by a phlebotomist and a urine specimen is obtained. The technician places the specimens in a rack to await analysis. Major Smith leaves the department at 12:00.

In the laboratory at 15:15 that afternoon, the labels and test orders are reviewed and the orders and various pieces of identifying information are transcribed into two log books. The tests are performed and their results are transcribed onto the requisition forms. These completed forms are put onto the receptionist's desk; the laboratory technician explains to the receptionist that no bed assignment for Major Smith is noted on the forms and hence, the technician does not know to which ward they should be sent. The receptionist telephones the Admissions and Dispositions Office to inquire about Major Smith's bed assignment. The clerk there peruses the Bed Status Worksheet, and after 1 minute, determines the bed to which Major Smith had been assigned when he registered. She informs the Clinical Laboratory receptionist of the assignment. This is transcribed

onto the completed forms, which are placed in the appropriate file to be delivered to the general surgical ward later in the afternoon.

Major Smith goes to the Radiology Department at 14:00, giving the clerk his requisition form. She checks the appointment schedule and then transcribes his name and Social Security number onto the department log. After 10 minutes, he is taken to the x-ray room and PA and Lateral chest films are taken. There are recorded in the technician's log book, along with Major Smith's Social Security number and name. The films are set aside to be interpreted.

At 15:00, a radiologist begins to examine the films, notes the solitary nodule on Major Smith's left lung and goes to the file librarian, inquiring if there are any additional historical chest films of Major Smith. The librarian checks the library file and, after 3 minutes, determines that there are. In two minutes, she retrieves them and delivers them to the radiologist. He examines the various films and dictates an interpretation. This is set aside to be typed. At 16:30, a transcriptionist types the interpretation. At 16:45, it is signed by the radiologist. The admitting office is telephoned to determine Major Smith's bed assignment (i.e., the destination of the report). At 18:00 a copy of the report is delivered to the surgical ward.

Major Smith arrives in the ECG Department at 14:35. He presents his requisition form to the clerk at the desk and is told to wait a few minutes. He is called to the desk after 15 minutes and the clerk transcribes his full name and identifier into the department log. A technician obtains two ECG tracings, sets one aside in a file to be read by the cardiologist that evening and gives the other to Major Smith, instructing him to take it with him to the surgery ward to be filed in his record.

When Major Smith returns to the ward at 15:15, the ward clerk telephones Major Smith's surgeon, to inquire if a special diet needs to be ordered for Major Smith or if any medication has been prescribed. The surgeon,

busy in the Surgery Clinic, returns the call after 20 minutes. He tells the ward clerk to order a pre-operative diet and says that he will come up to the floor soon to write a medication order.

The clerk telephones the Dietary Department to order Major Smith's diet. He informs the Dietary Department clerk of Major Smith's name, Social Security number and bed assignment and orders his evening meal. At 15:30, the ward clerk prepares a bed status report for the ward, which is delivered to the Admissions and Dispositions Office.

Major Smith's surgeon arrives at the general surgical ward at 16:40, signs the diet order and writes out a medication order for 50 mg of pentobarbital for Major Smith. He looks through the Clinical Record, searching for the ECG tracing, which he does not find, and asks the ward clerk about its whereabouts. The ward clerk goes to Major Smith's room and asks him for the tracing; Major Smith reports that it has apparently been mislaid. The clerk returns to the nurses station, informing the surgeon that Major Smith did have an ECG that afternoon but that he has, unfortunately, lost his copy of it; the surgeon will have to wait for the cardiologist's report or go down to the ECG Department to check the reading. The surgeon says that he will wait for the cardiologist's report, which should be available before surgery.

Major Smith receives his evening meal at 17:00.

The ward clerk telephones the Pharmacy to inform the clerk there that a medication order is awaiting pick-up. At 17:15, a pharmacy clerk picks up the medication order and takes it back to the inpatient pharmacy.

Upon receiving the medication order, the pharmacy clerk examines the order form and then checks the formulary to make sure that the medication ordered is available. It is not available in the dosage prescribed. The clerk shows the order form to the pharmacist, who telephones Major Smith's surgeon to ask him how he would like to change the medication order. The

pharmacist is told that the surgeon has left for the day, but that a resident will return the call shortly. After 15 minutes, a resident does return the call, and informs the pharmacist that the dosage may be changed to 60 mg. At 18:25, the resident goes to the surgical ward and writes the new medication order in Major Smith's chart. The ward clerk takes the new medication order down to the inpatient pharmacy.

Upon receipt, the clerk examines the order slip and checks the formulary, and the name, patient number, and bed assignment of Major Smith. He transcribes these into the Pharmacy Log and prepares a Medication Profile for Major Smith, transcribing his name, Social Security number, bed assignment and medication order onto this form. He then types a label for the medication, makes a mistake, retypes the label and puts it on the medication container. He sets the container on the tray of inpatient orders to be filled by the pharmacy technician. The container is filled and then checked by the pharmacist. The quantity of medication dispensed for Major Smith is recorded in the Pharmacy Inventory Log Book and in the Controlled Substances Log Book. The medication is then set aside to be delivered with the evening medications for the general surgical ward.

At 19:00 the Clinical Laboratory results are delivered to the surgical ward and are filed in Major Smith's chart. The ward clerk notices that no ECG report has yet arrived. He telephones the ECG Department to check on the status of the report. After 5 minutes the clerk in the ECG Department returns his call, telling him that though they have a notation that Major Smith had an ECG taken that afternoon, no report can be found, nor was a notation made in the log book regarding whether the reading was found to be normal or not. The clerk suggests that perhaps some portion of the reporting form had been illegible and hence the completed cardiologist's report had not been able to be returned to the appropriate patient's chart.

The ward clerk alerts the charge nurse of the fact that no ECG report is available for Major Smith, who is scheduled for surgery the next morning.

The nurse tells him that there will be time in the morning before surgery for another ECG tracing to be performed. She telephones the resident to ask him to come to the ward to write an order for a new ECG. At 21:00 he does so.

Major Smith's sleeping medication arrives on the ward at 20:00; it is administered and he sleeps through the night. He is awakened with breakfast the next morning, but luckily remembers that his orders are NPO because he is scheduled for surgery at 10:00. He tells the dietary technician this and she informs the ward clerk. The ward clerk telephones the Dietary Department to explain Major Smith's diet orders for the day. The clerk in the Dietary Department transcribes these into the Dietary Record Book.

At 7:30, the ward clerk telephones the ECG Department to inform them that Major Smith has an order for a pre-operative ECG and, as he is scheduled for surgery at 10:00, a tracing must be taken immediately. The clerk there transcribes Major Smith's name and Social Security number onto the ECG Record Book and says that she will send a technician up as soon as possible. A technician arrives after 15 minutes and two tracings are taken. The cardiologist is telephoned by the ECG technician and asked to do a STAT reading. At 8:30, the cardiologist telephones the nursing station and informs the charge nurse that the ECG is normal. This is noted in the patient's chart. The ECG report is delivered to the ward at 9:00 and filed in Major Smith's chart.

Major Smith is prepared for surgery and taken to the Operating Room at 9:30. When the biopsy is completed, the OR clerk prepares a label for the biopsy specimen, which is taken to the Pathology Laboratory for analysis. When the specimen arrives at the Pathology Laboratory, the label is examined and the specimen's receipt logged into a specimen book. A frozen section performed during surgery shows that the lesion is not malignant. Major Smith is taken to the Recovery Room at 11:00.

While Major Smith is in the Recovery Room, the general surgical ward nurses make five telephone calls to the OR to determine Major Smith's status. They are quite busy on the floor and wish to schedule their duties so that they will be able to give Major Smith the post-operative care he will require when he returns, while not neglecting other patients.

Before Major Smith returns to the surgical ward, his surgeon goes to the ward and writes a post-operative medication order for ampicillin (500 mg). This order is taken to the inpatient pharmacy, where it is processed, and a unit dose is sent up to the floor.

When Major Smith arrives on the floor at 13:45, the charge nurse notices that though his chest tube is functioning well, the chest tube drainage unit is not; it must have been damaged in transit from the Recovery Room. The nurse telephones the surgical resident, requesting that he come to the ward and replace the unit.

After 15 minutes, the resident arrives on the ward and inquires at the nurses station about Major Smith's bed assignment. The ward clerk checks the Bed Assignment Roster and after 1 minute informs the resident of Major Smith's location. The resident walks to the room, and examines the drainage unit. He tells the nurse that it must be replaced. She goes down the hallway to the supply cabinet and searches for a new unit. After 5 minutes, she returns to Major Smith's room and explains to the resident that no drainage units are available on the floor. He tells her to obtain one from another surgical unit as soon as possible and to telephone him in the Surgery Clinic when it arrives, so that he can come up and attach it. The nurse goes to the nurses station, and telephones the other general surgical unit. The clerk there tells her that he will return the call when he has located a new unit.

Major Smith is groggy and sleeps until 14:50. When he awakens, the nurse checks his record and discovers that he has a penicillin allergy. She

sends the medication back to the Pharmacy and calls the surgical resident for an alternative medication. He orders cephoxitin (500 mg) four times a day. The medication cancellation and new order are taken to the Pharmacy where they are processed.

At 15:50, the clerk in the other surgical unit telephones the ward and informs the ward clerk that the new drainage unit is ready. The ward clerk informs the charge nurse of this fact and she sends him to pick up the unit. He returns to the nurses station after 20 minutes and gives the unit to the nurse. She telephones the Surgery Clinic, requesting that the surgical resident come to the floor to replace the damaged unit. After 25 minutes, he does so.

At 17:00, Major Smith's surgeon goes to the surgical floor to check on his condition. He finds him awake and well and leaves overnight orders in his chart, including an order for a routine post-operative chest x-ray. The x-ray is taken at 10:50 the next morning.

Major Smith convalesces without difficulty.

On Saturday, September 11 at 17:00, the pathology report arrives on the surgical ward. The final report shows that the lesion was a granuloma and non-tuberculous.

On Sunday afternoon at 15:00 the surgeon writes discharge orders for Monday.

At 8:30 Monday morning, after Major Smith has finished his breakfast, the ward clerk reviews the chart, checking if the notations have been signed, and the times they were made are noted, and if order slips and examination and laboratory results are correctly filed.

One of the nurses on the ward then gives Major Smith his chart and checks him out of the ward, handing him his Patient's Clearance Record and Out-Processing Sheet and directing him to the Admissions and Dispositions Office and to the Resource Management Office.

He goes to the Resource Management Office and gives the clerk there his Out-Processing Sheet and the receipt for his valuables. He signs for the valuables and they are delivered to him. Their delivery is logged by the clerk, the clerk tallies the number of days that Major Smith has been hospitalized, and hence the subsistence charges he owes. He tells her that he does not have sufficient cash to pay the charges immediately. The clerk prepares a bill and hands it to him.

Major Smith leaves the Resource Management Office, goes to the Admissions and Dispositions Office, and, after waiting 10 minutes, gives the clerk his Patient's Clearance Record and Out-Processing Sheet. She transcribes various pieces of information onto these, pulls his 3x5 card from the Nominal Index File, and notes his discharge on the Bed Status Worksheet. She then collects his various discharge forms, and sends him home.

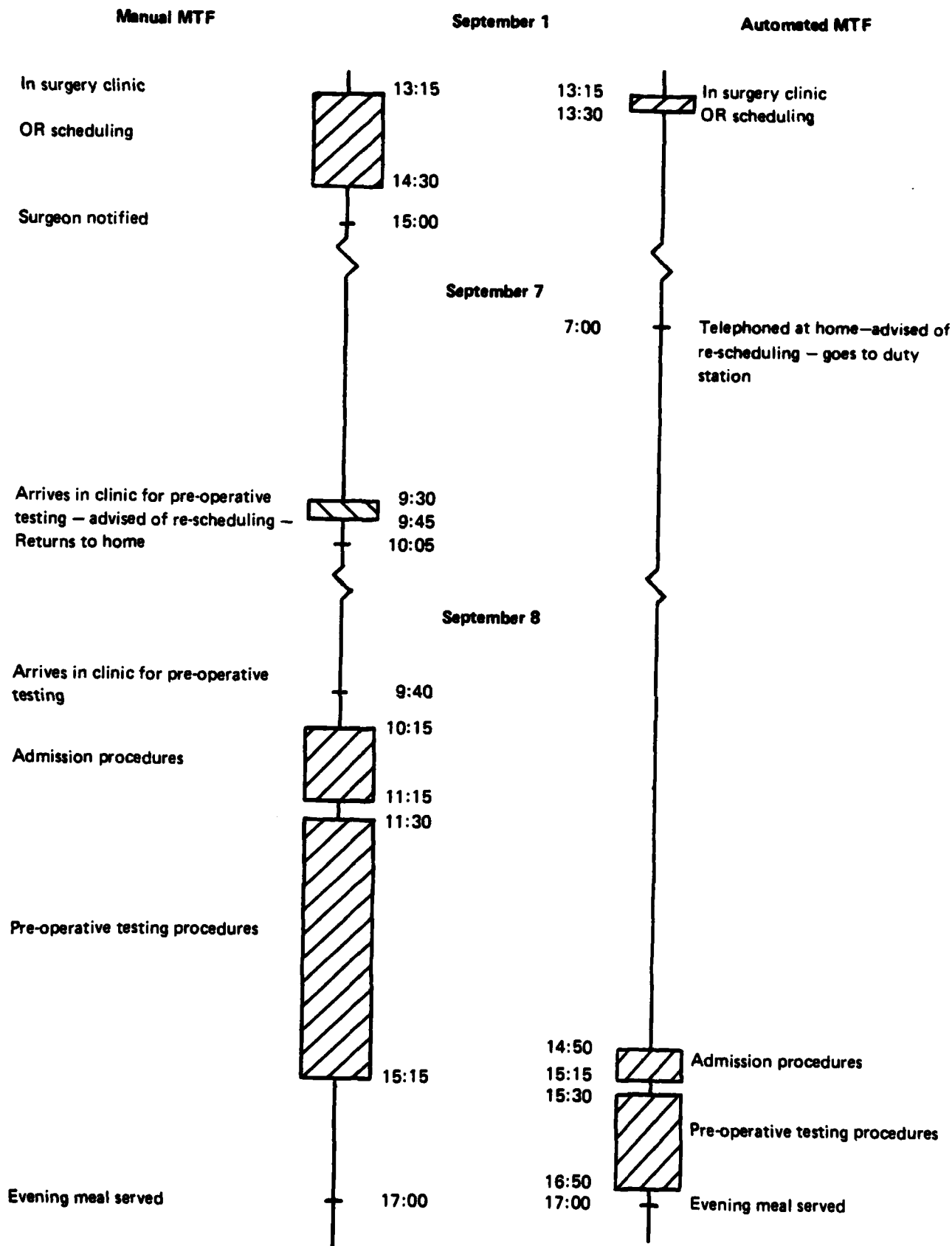


FIGURE 2 TIME LINE FOR INPATIENT SCENARIOS

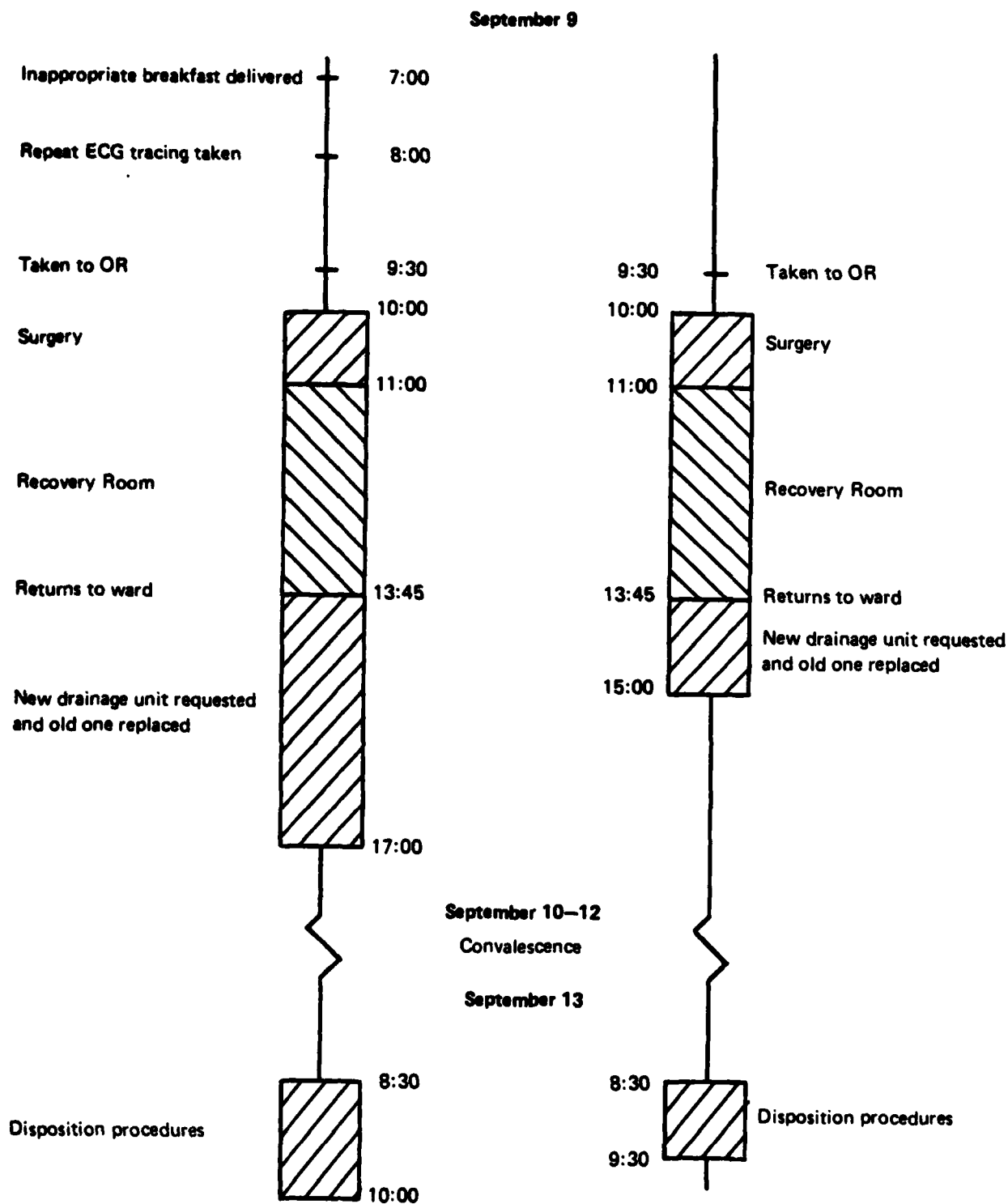


FIGURE 2 TIME LINE FOR INPATIENT SCENARIOS (Continued)

INPATIENT SCENARIO--AUTOMATED INFORMATION PROCESSING

On Wednesday, September 1, at 13:15, Major John Smith, age 35, is being examined in a surgeon's clinic office in a 350-bed, fully-automated Medical Treatment Facility (MTF) located 20 minutes from his home and 35 minutes from his duty station. He has had a chest x-ray and several laboratory procedures during a recent visit to the Family Practice Clinic, and his family care physician has referred him to the Surgery Clinic for consultation. The surgeon examines Major Smith, reviews the x-rays and a hard copy of the x-ray report--which mentions a new solitary nodule in the left lung--and a copy of the laboratory report, which shows a low white blood cell count. He determines that Major Smith should be admitted to the hospital for a lung biopsy.

The surgeon and Major Smith walk from the examining room to the surgeon's office where his cathode ray tube (CRT) computer terminal is located. The surgeon types his Physician Code into the terminal to log onto the computer system, and then types a request for an operating room suite for an elective lung biopsy on September 8. The screen displays the times that are open in the Operating Room (OR) for that date. The surgeon chooses 10:00 and registers Major Smith by entering his Social Security number and Family Member Prefix Code. The terminal displays Major Smith's full name and date of birth for verification. The surgeon confirms that the correct patient has been scheduled. He then keys in a request that pre-operative diagnostic procedures be scheduled, and chooses from the "menu" of procedures a chest x-ray, an ECG, and various laboratory tests. He orders these procedures for Major Smith to be conducted on September 7, specifying a preference for the late afternoon. He selects a routine pre-operative diet for Major Smith's evening meal on September 7, NPO orders for the morning of surgery, and enters a medication order for pentobarbital (50 mg) to be administered at bedtime before surgery. All of these orders are registered, save the medication order; this is rejected by the computer, which indicates on the CRT screen

that the 50 mg dosage is not registered in the automated pharmacy formulary. The surgeon is given the option of changing the dosage to 30 mg or 60 mg. He chooses the 60 mg dosage for Major Smith. This total interaction with the terminal takes 3 minutes.

The surgeon informs Major Smith that he is scheduled for surgery on September 8, suggesting that he arrive at the Admissions and Dispositions Office of the hospital at 15:00 the afternoon before, to undergo the pre-operative and admission procedures.

At 7:00 on September 7, Major Smith receives a telephone call from a clerk in the Admissions and Dispositions Office of the hospital, informing him that his admission and surgery must be postponed until September 8 as there have been more emergency surgical procedures than anticipated during the past week. He should plan to come to the hospital Wednesday afternoon, around 15:00. The clerk apologizes for giving Major Smith this news at the last minute, but explains that these things are unpredictable. She expresses the hope that, as she has notified him early in the day, he will be able to go to his duty station as usual on Tuesday. He does so.

Major Smith arrives at the Admissions and Dispositions Office at 14:50 Wednesday afternoon, having left his duty station at 14:15. He waits for 3 minutes at the registration desk and then presents his military identification card to the clerk. She examines the card and keys his Social Security number into the CRT at her desk. Major Smith's full name and birthdate appear on the screen for verification. She confirms these data. She then requests a hard copy of the demographic data available concerning Major Smith and hands this to him, asking him to note any inaccuracies or changes that have occurred in place of residence, rank, etc., since he was last seen at the hospital.

After 1.5 minutes, Major Smith hands the corrected sheet to the receptionist. She keys in his number and makes the appropriate corrections

in the demographic data. She then keys in a code to indicate that Major Smith is now registering for admission. He is automatically assigned a unique register number and a surgical bed; his bed assignment is displayed on the screen. Major Smith is automatically registered in the hospital's Nominal Index and Patient Location File, and all hospital departments, e.g., the Information Desk, Chaplain, Mail Room, and Clinical Records Section, now have access to information relating to his admission. The ward clerk on the general surgical ward receives a notification via CRT that Major Smith has arrived, and his admission is automatically registered in the on-line Bed Status Roster and the on-line Admissions and Dispositions Sheet. A notification of Active Duty Patient Admission will be automatically generated later in the day, as will hard copies of the Admissions and Dispositions Sheet.

The receptionist then keys in a request for information regarding Major Smith's pre-operative orders, and these are displayed on the screen. She requests a hard copy of these, so that Major Smith will know which ancillary departments to go to, and in what sequence, and a hard copy of the Admission Authorization and Treatment Statement (certified by Major Smith's surgeon) and a Privacy Act Statement, and gives these papers to Major Smith. She asks him to sign the Admission Authorization and Treatment Statement and the Privacy Act Statement. He does so and returns these to her. She then asks him for certain emergency data and keys these into the terminal. The terminal displays each of her entries for verification and does not allow technical errors of entry. She then keys in a request for a Patient Wrist Band Insert, prepares the wrist band, and gives it to Major Smith, directing him to the Resource Management Office and to the general surgical ward.

Major Smith goes to the MSA office and deposits his valuables with the clerk there. She keys his Social Security number into her terminal, registers his deposits, and requests a hard copy receipt. She hands the receipt to him.

Major Smith leaves the registration area and goes to the surgical ward. Upon arrival, he waits for the ward clerk to check his bed assignment at the nursing station CRT. Major Smith's Social Security number is keyed in and his bed assignment is displayed. After 1 minute, the ward clerk takes him to his bed and then directs Major Smith to the ancillary departments.

After leaving the ward at 15:25, Major Smith goes to the Clinical Laboratory. He hands the clerk his hard copy requisition form. She keys his Social Security number into her terminal, registering Major Smith's arrival at the laboratory. She tells him to wait a few minutes until a phlebotomist is free to draw his blood. After 4 minutes, he is called to the desk. The clerk again keys in his Social Security number and a code to request a display of the laboratory procedures to be performed. She then keys in a request for generation of hard copy labels and attaches these to three specimen containers. Major Smith's blood is drawn by a phlebotomist and a urine specimen is obtained. The technician places the specimens in a rack to await analysis, and Major Smith is told that he may leave the department.

In the Clinical Laboratory that afternoon at 16:05, the labels are examined and the on-line test orders reviewed by a laboratory technician. The technician keys a code into the terminal indicating that she is about to perform the various tests. The tests are performed, and their results are entered into the computer and incorporated into the diagnostic summary portion of Major Smith's automated record, and are then available to any authorized CRT user in the facility.

Major Smith goes to the Radiology Department at 15:45 and hands the clerk his requisition form. She keys his Social Security number into her terminal, registering his arrival at the department. After 8 minutes, he is taken to the x-ray room and PA and Lateral chest films are taken. Their performance is recorded on-line by the technician. She is alerted by the computer that several historical films are available. She transmits a request that these be pulled from the department files by the file

librarian, who, receiving the request at 16:00, retrieves them and sets them aside with the new films for the radiologist to read.

At 16:20, a radiologist begins to examine the new films, comparing them to the historical ones. He keys his interpretation into a terminal, selecting from a "menu" of predetermined interpretation codes. The interpretation report is generated by the computer; then it is verified and certified by the radiologist. The interpretation is automatically incorporated into the diagnostic summary in Major Smith's record. All authorized CRT users in the MTF now have on-line access to this report.

At 16:10, Major Smith goes to the ECG Department. He presents his requisition form with his Social Security number to the clerk and is told to wait a few minutes. She keys in a code to indicate his registration. He is called to the desk after 10 minutes. A technician obtains one ECG tracing and receives an analysis of this from the computer, including a serial comparison with previous tracings. The technician attaches the ECG requisition to the ECG tracing and unconfirmed report generated by the computer and sets them aside to be over-read by the cardiologist that evening. She gives Major Smith a copy of the unconfirmed report with the tracing and instructs him to take it with him to the surgery ward to be reviewed by his surgeon.

Major Smith returns to the ward at 16:50, and he goes to his bed. The ward clerk keys in at the nurses station terminal to determine if a special diet has been ordered for Major Smith or if any medication has been prescribed. He notes that orders were entered when the surgical procedure was scheduled and automatically transferred from September 7 to September 8 when the biopsy was rescheduled.

Major Smith's surgeon comes to the general surgical ward at 17:00 to review the ECG tracing of that afternoon. He looks in Major Smith's file for the tracing, which he does not find, and he asks the ward clerk about its whereabouts. The ward clerk goes to Major Smith's room

and asks him for the ECG tracing, which Major Smith reports has apparently been mislaid. The clerk returns to the nurses station, informing the surgeon that Major Smith did have an ECG that afternoon, but that he has, unfortunately, lost his copy of the tracing; the surgeon keys into the CRT at the nursing station, scanning the ECG portion of the diagnostic summary in Major Smith's record. Noting that only the unconfirmed interpretation is available, he requests a hard copy of the tracing from the computer terminal. He goes to the printer in the ECG Department to obtain the copy and notes that the ECG seems normal.

Major Smith receives his evening meal at 17:00.

At 18:00, the Pharmacy is involved in dispensing the evening medication orders for inpatients. Major Smith's 60 mg pentobarbital is among those on the list of unit doses to be dispensed. The list is displayed on a CRT in the Pharmacy. A container label identifying his medication by full name, Social Security number, and bed assignment, is generated by the computer. The containers are filled by the pharmacy technician in sequence and then checked by the pharmacist. The quantity of medication dispensed is automatically registered as a reduction in inventory and as a reduction in controlled substances inventory. The medication is then set aside to be delivered at 20:00.

At 18:15, the cardiologist enters his reading of Major Smith's ECG into a CRT in the ECG Department. He concurs with the computerized analysis that the tracing is normal. This interpretation is automatically incorporated into the diagnostic summary portion of Major Smith's automated record.

Major Smith's sleeping medication arrives on the ward at 20:00; it is administered, and he sleeps through the night. No breakfast is delivered to his room in the morning, as the Dietary Department has filled only those meal orders that are registered in the computerized system; and Major Smith's surgeon had indicated, upon scheduling the biopsy, that Major Smith was to be NPO on the morning of surgery.

Major Smith is prepared for surgery and taken to the Operating Room at 9:30. When the biopsy is completed, the OR clerk prepares a label for the biopsy specimen, which is taken to the Pathology Laboratory for analysis. When the specimen arrives at the Pathology Laboratory, the label is examined and the specimen's receipt keyed into a terminal. A frozen section performed during surgery shows that the lesion is not malignant. Major Smith is taken to the Recovery Room at 11:00.

While Major Smith is in the Recovery Room, the general surgical ward nurses check his status from their CRT, noting that he is not yet expected to return to the ward; they are quite busy on the floor and wish to schedule their duties so that they will be able to give Major Smith the post-operative care he will require when he returns to the floor, while not neglecting other patients.

Before Major Smith returns to the surgical ward, his surgeon keys a post-operative medication order for ampicillin (500 mg) into his terminal. The terminal does not register the order, but instead a message appears on the CRT stating that Major Smith has a history of possible allergy to penicillin as an outpatient 5 years ago, and suggesting that an alternative antibiotic may be advisable. The surgeon chooses cephoxitin (500 mg) in place of the ampicillin. This order is transmitted to and processed by the inpatient pharmacy, and a unit dose is sent up to the floor.

When Major Smith arrives on the floor at 13:45, the charge nurse notices that though his chest tube is functioning well, the chest tube drainage unit is not; it must have been damaged in transit from the Recovery Room. The nurse telephones the surgical resident, requesting that he come to the ward and replace the unit. After 15 minutes, the resident arrives on the ward and inquires at the nurses station about Major Smith's bed assignment. The ward clerk checks the computerized Bed Assignment Roster at his CRT and after 0.5 minutes informs the resident of Major Smith's location. The resident walks to Major Smith's room and examines the drainage unit. He tells the nurse that it must be

replaced. She goes down the hallway to the small supply cabinet. Due to the automated logistics system, supplies are carefully monitored and replenished from Central Supply daily as they are consumed. The nurse finds a new unit, and, after 3 minutes, she returns to Major Smith's room with it. The resident replaces the damaged unit.

Major Smith is groggy and sleeps until 14:50.

At 17:00, the surgeon goes to the surgical floor to check on Major Smith's condition. He finds him awake and well. He keys overnight orders into the terminal at the nurses' station and an order for a routine post-operative chest x-ray. He sees that this is scheduled for 10:45 the next morning and informs the nurse of this fact.

Major Smith sleeps quietly through the night.

The chest x-ray is performed at 10:45 the next morning. Major Smith convalesces without difficulty.

On Saturday, September 11, at 15:00, the final pathology report is entered into the computer. It shows that the lesion was a granuloma--non-tuberculous. This pathology result is automatically incorporated into the patient record and available on-line to any authorized CRT user in the facility. On Sunday afternoon, Major Smith's surgeon enters discharge orders for Monday into the terminal.

At 8:30 the next morning, after Major Smith has finished his breakfast, the ward clerk reviews his automated medical record, checking if the discharge orders have been entered. He notes that all examination and laboratory results are on-line.

One of the nurses on the ward then gives Major Smith his Patient's Clearance Record and Out-Processing Sheet and directs him to the Admissions and Dispositions Office and to the Resource Management Office.

He goes to the Resource Management Office and gives the clerk there his Out-Processing Sheet and the receipt for his valuables. He signs for the valuables and they are delivered to him. Their delivery is logged into a CRT by the clerk. The clerk keys in a request for a calculation of subsistence charges for Major Smith's hospital stay. He tells her that he does not have sufficient cash to pay the charges immediately. The clerk requests that a hard copy of the bill be generated for Major Smith and hands this to him.

Major Smith leaves, goes to the Admissions and Dispositions Office, and after waiting 5 minutes, gives the clerk his Patient's Clearance Record and Out-Processing Sheet. She keys in his Social Security number and registers his discharge from the facility. He is automatically removed from the Nominal Index and the on-line Bed Status Roster, and his discharge is registered in the on-line Admissions and Dispositions Sheet, hard copies of which will be generated later on. She collects his various discharge forms and sends him home.

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